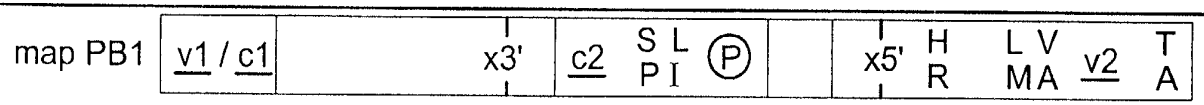
FIG. 1

Type	Origin	PB1: Positions 52	54	105	175	208	298	364	383	384	396	431	464
H7N7	Bratislava 82 chicken	K	K	N	D	K	L	L	E	**P**	**I**	Y	D
H7N7	Rostock34 chicken	K	K	N	D	K	L	L	E	S	L	Y	D
H1N1	WSN33 human	R	R	T	N	R	I	I	D	S	L	H	N
H1N1	Wisconsin88 human	R	K	N	E	K	L	L	D	S	L	Y	D
H2N2	Singapore57 human	K	K	N	D	K	L	L	E	S	L	Y	D
H2N2	Ann Arbor60 human	K	K	N	D	K	L	L	E	S	L	Y	D
H3N2	Honkong68 human	K	K	N	D	K	L	L	E	S	L	Y	D
H3N2	Shiga97 human	K	K	N	D	K	L	L	E	S	L	Y	D
H3N2	Hongkong82 swine	K	K	N	D	K	L	L	E	S	L	Y	D
H3N2	Katakyushu93 human	R	K	N	D	K	L	L	E	S	L	Y	D
H3N8	Tennessee86 equine	K	K	N	N	K	L	L	E	S	L	Y	D
H4N2	Minnesota80 turkey	K	K	N	D	K	L	L	E	S	L	Y	D
H4N6	Ontario99 swine	K	K	N	D	K	L	L	E	S	L	Y	D
H5N1	Hongkong97 human	K	R	N	D	K	L	L	E	S	L	Y	D
H6N1	Taiwan99 chicken	K	K	N	D	K	L	L	E	S	L	Y	D
H7N7	London73 equine	K	K	N	D	K	L	L	D	S	L	Y	D
H9N2	Pakistan99 chicken	K	K	N	D	K	L	L	E	S	L	Y	D

FIG 1 (continued)

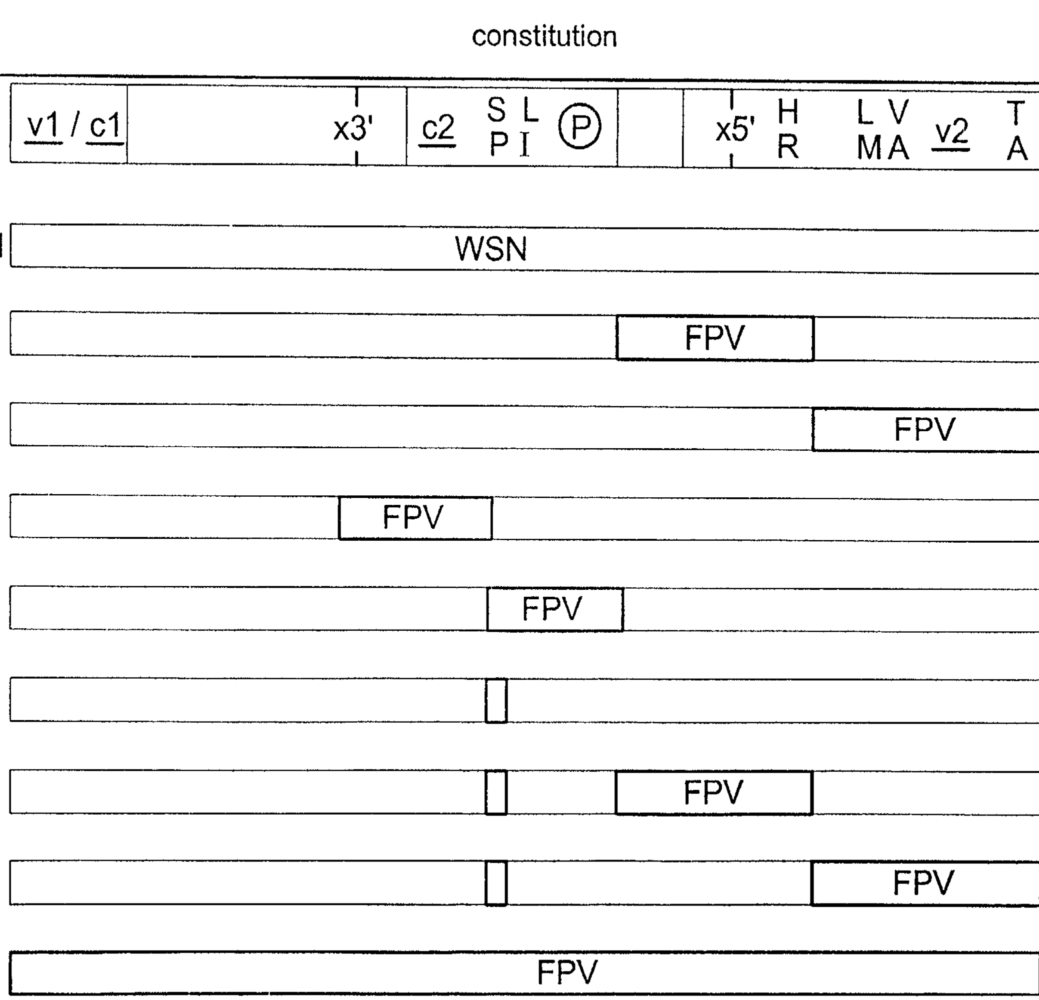
Type	Origin	PB1: Positions 473	576	584	628	633	636	644	645	654	741
H7N7	Bratislava 82 chicken	V	L	R	**M**	S	E	**A**	V	S	A
H7N7	Rostock34 chicken	V	L	R	L	S	E	V	V	S	A
H1N1	WSN33 human	L	I	H	L	N	D	V	I	N	T
H1N1	Wisconsin88 human	L	I	R	L	S	E	V	V	T	A
H2N2	Singapore57 human	V	L	R	L	S	E	V	V	S	A
H2N2	Ann Arbor60 human	V	L	R	L	S	E	V	V	S	A
H3N2	Honkong68 human	V	L	Q	L	S	E	V	V	S	S
H3N2	Shiga97 human	V	L	Q	L	S	E	V	V	S	S
H3N2	Hongkong82 swine	V	L	R	L	S	E	V	V	S	A
H3N2	Katakyushu93 human	V	L	Q	L	S	E	V	V	S	S
H3N8	Tennessee86 equine	V	L	R	L	S	E	V	V	S	A
H4N2	Minnesota80 turkey	V	L	R	L	S	E	V	V	N	A
H4N6	Ontario99 swine	V	L	R	L	S	E	V	V	S	A
H5N1	Hongkong97 human	V	L	R	L	S	E	V	V	S	A
H6N1	Taiwan99 chicken	V	L	R	L	S	E	V	V	S	A
H7N7	London73 equine	V	L	R	L	S	E	V	V	S	A
H9N2	Pakistan99 chicken	V	L	R	L	S	E	V	V	S	A

Fig.2



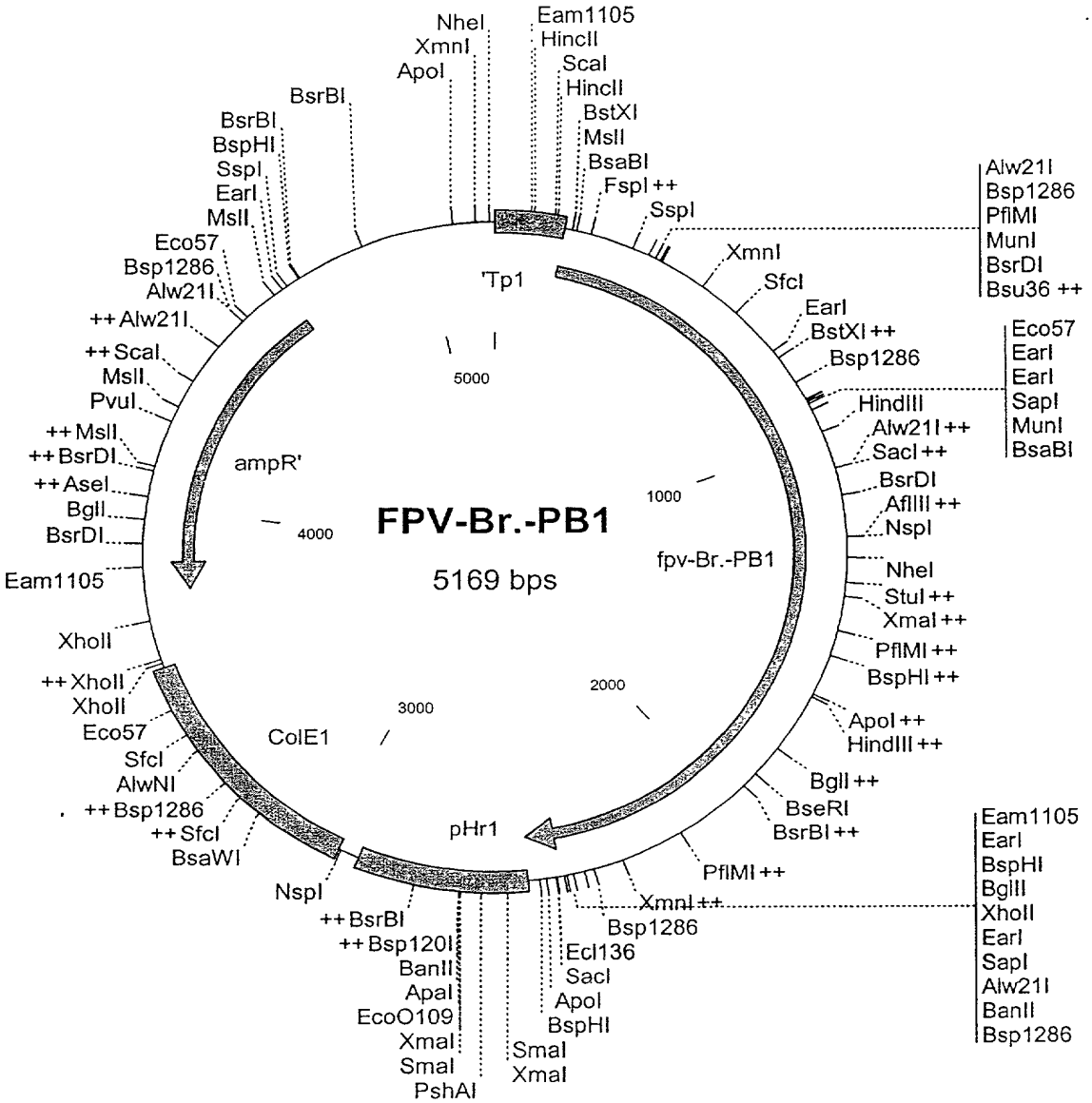
plasmid	constitution	other segments	orig.titer	CAT assay 293T	CAT assay MDCK
WSN-PB1	WSN	WSN	$7x10^8$/ml	11	2
pHL3102	WSN / FPV	WSN	$1x10^8$/ml	22	38
pHL3103	FPV / WSN	WSN	$2x10^7$/ml	10	13
pHL3130	WSN / FPV	WSN	$1x10^5$/ml	14	25
pHL3131	WSN / FPV / WSN	WSN	$2x10^6$/ml	18	25
pHL3115	FPV	WSN	$3x10^5$/ml	17	28
pHL1844	FPV	FPV	$3x10^9$/ml	48	100

Fig.3



plasmid	other segments	orig.titer	CAT assay 293T	CAT assay MDCK
map PB1				
WSN-PB1	WSN	$7x10^8$/ml	11	2
pHL3204	WSN	$2x10^8$/ml	12	3
pHL3203	WSN	$1x10^8$/ml	24	42
pHL3246	WSN	$3x10^8$/ml	10	3
pHL3247	WSN	$4x10^6$/ml	20	29
pHL3258	WSN	$1x10^7$/ml	28	50
pHL3259	WSN	$3x10^7$/ml	32	61
pHL3268	WSN	$3x10^7$/ml	39	71
pHL1844	FPV	$3x10^9$/ml	48	100

Fig. 4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fpv-Br.-PB1
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pHr1
ampR'
ColE1
1000
2000
3000
4000
5000
NheI
XmnI
ApoI
Eam1105
HincII
ScaI
HincII
BstXI
MslI
BsaBI
FspI++
SspI
XmnI
SfcI
EarI
BstXI++
Bsp1286
HindIII
Alw21I++
SacI++
BsrDI
AflIII++
NspI
NheI
StuI++
XmaI++
PflMI++
BspHI++
ApoI++
HindIII++
BglI++
BseRI
BsrBI++
PflMI++
XmnI++
Bsp1286
Ecl136
SacI
ApoI
BspHI
SmaI
XmaI
PshAI
EcoO109
XmaI
SmaI
BanII
Apal
++Bsp120I
++BsrBI
NspI
BsaWI
++SfcI
++Bsp1286
AlwNI
Eco57
SfcI
XhoII
++XhoII
XhoII
Eam1105
++BsrDI
++AseI
BglI
BsrDI
++MslI
PvuI
MslI
++ScaI
++Alw21I
Eco57
Bsp1286
Alw21I
MslI
EarI
SspI
BspHI
BsrBI
BsrBI
Alw21I
Bsp1286
PflMI
MunI
BsrDI
Bsu36++
Eco57
EarI
EarI
SapI
MunI
BsaBI
Eam1105
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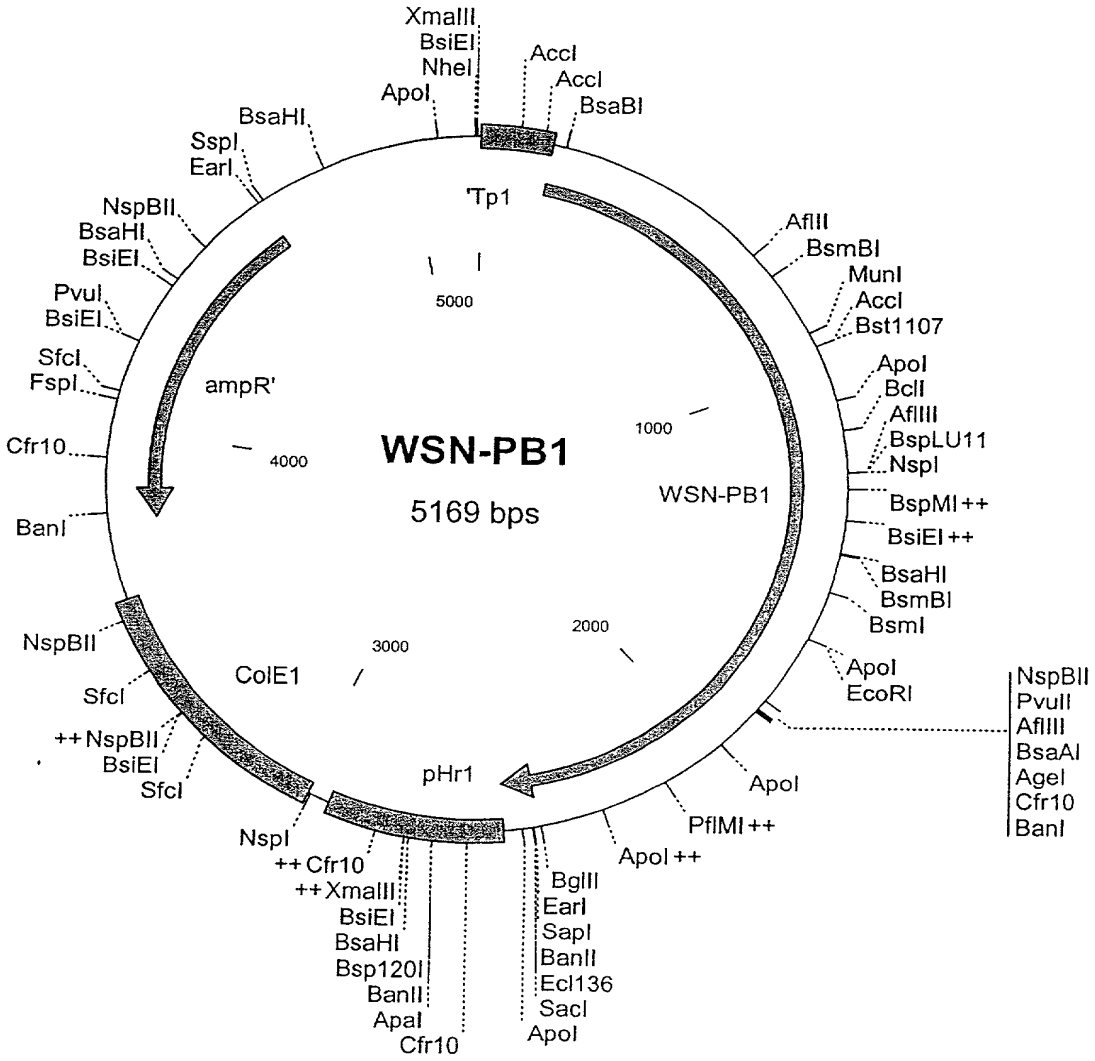
BspHI
BglII
XhoII
EarI
SapI
Alw21I
BanII
Bsp1286

Fig. 5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WSN-PB1
Tp1
pHr1
ampR'
ColE1
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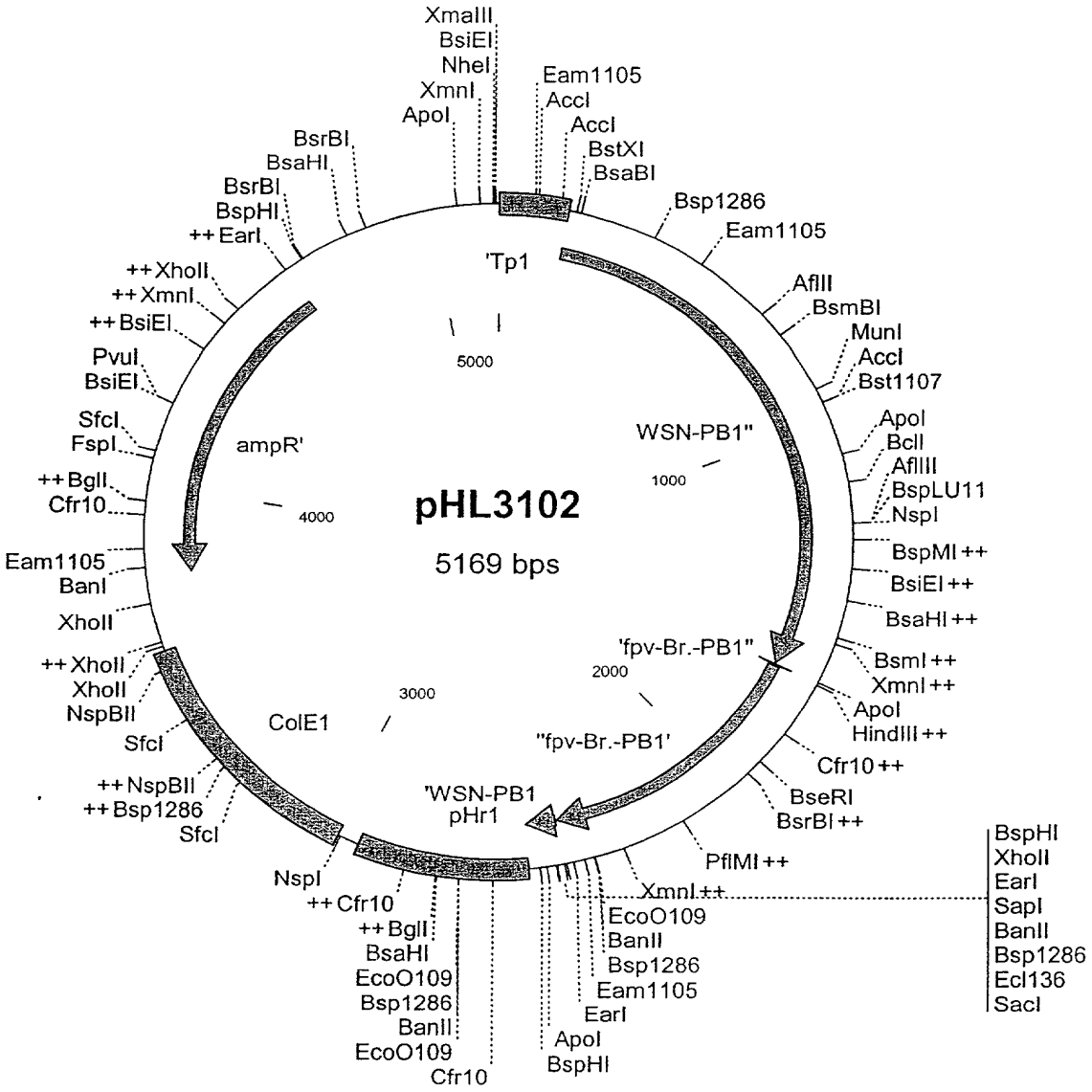
2000
3000
4000
5000
XmaIII
BsiEI
NheI
ApoI
AccI
AccI
BsaBI
AflII
BsmBI
MunI
AccI
Bst1107
ApoI
BclI
AflIII
BspLU11
NspI
BspMI++
BsiEI++
BsaHI
BsmBI
BsmI
ApoI
EcoRI
NspBII
PvuII
AflIII
BsaAI
AgeI
Cfr10
BanI
ApoI
PflMI++
ApoI++
BglII
EarI
SapI
BanII
Ecl136
SacI
ApoI
NspI
++Cfr10
++XmaIII
BsiEI
BsaHI
Bsp120I
BanII
ApaI
Cfr10
++NspBII
BsiEI
SfcI
SfcI
NspBII
BanI
Cfr10
SfcI
FspI
PvuI
BsiEI
NspBII
BsaHI
BsiEI
SspI
EarI
BsaHI

Fig. 6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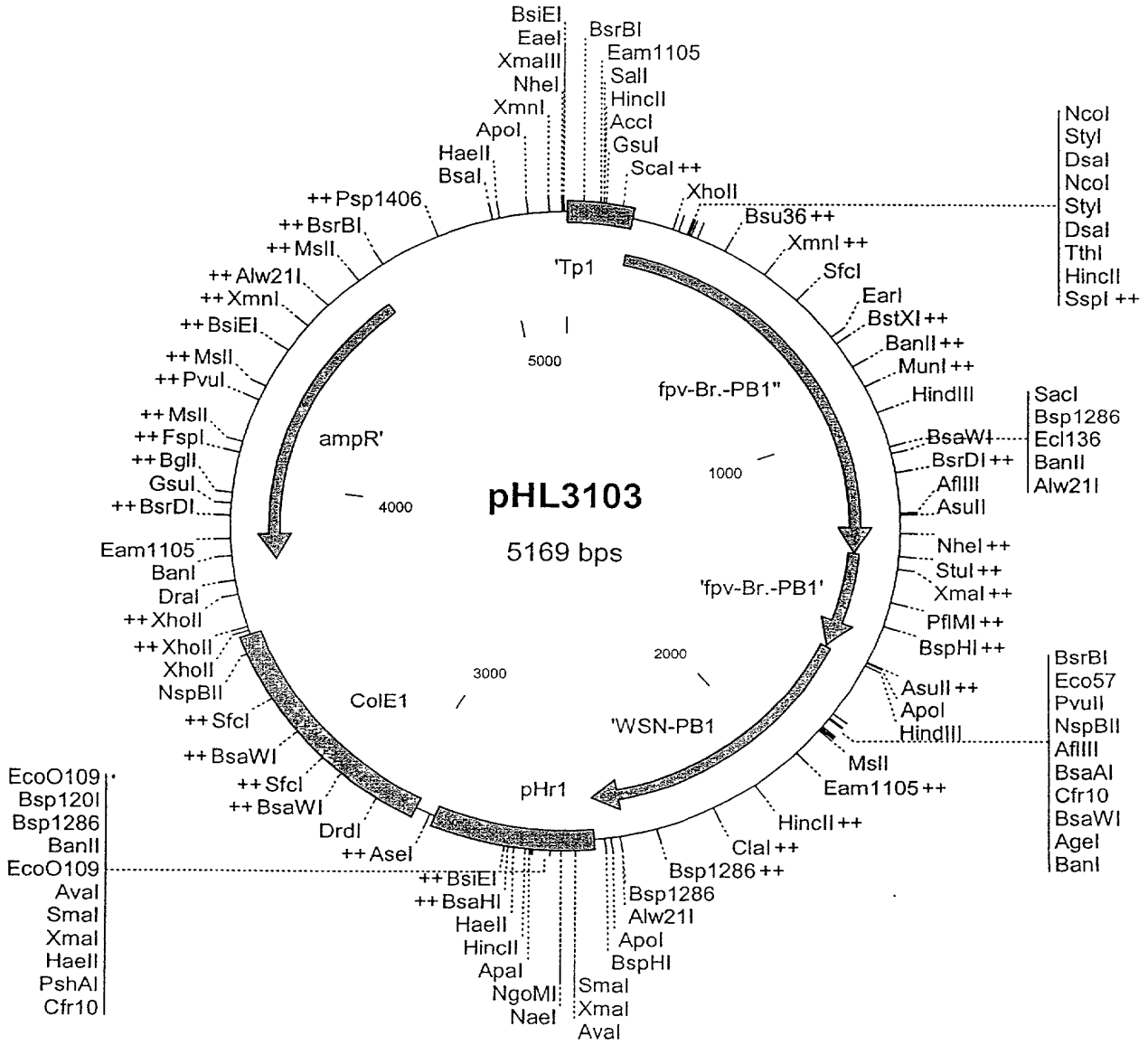
"fpv-Br.-PB1'
'WSN-PB1
pHr1
ampR'
ColE1
5000
1000
2000
3000
4000
XmaIII
BsiEI
NheI
XmnI
ApoI
Eam1105
AccI
AccI
BstXI
BsaBI
Bsp1286
Eam1105
AflII
BsmBI
MunI
AccI
Bst1107
ApoI
BclI
AflIII
BspLU11
NspI
BspMI++
BsiEI++
BsaHI++
BsmI++
XmnI++
ApoI
HindIII++
Cfr10++
BseRI
BsrBI++
PflMI++
XmnI++
EcoO109
BanII
Bsp1286
Eam1105
EarI
ApoI
BspHI
BspHI
XhoII
EarI
SapI
BanII
Bsp1286
Ecl136
SacI
NspI
++Cfr10
++BglI
BsaHI
EcoO109
Bsp1286
BanII
EcoO109
Cfr10
++NspBII
++Bsp1286
SfcI
SfcI
NspBII
XhoII
++XhoII
Eam1105
BanI
XhoII
++BglI
Cfr10
SfcI
FspI
PvuI
BsiEI
++BsiEI
++XmnI
++XhoII
++EarI
BspHI
BsrBI
BsaHI
BsrBI

Fig. 7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ampR'
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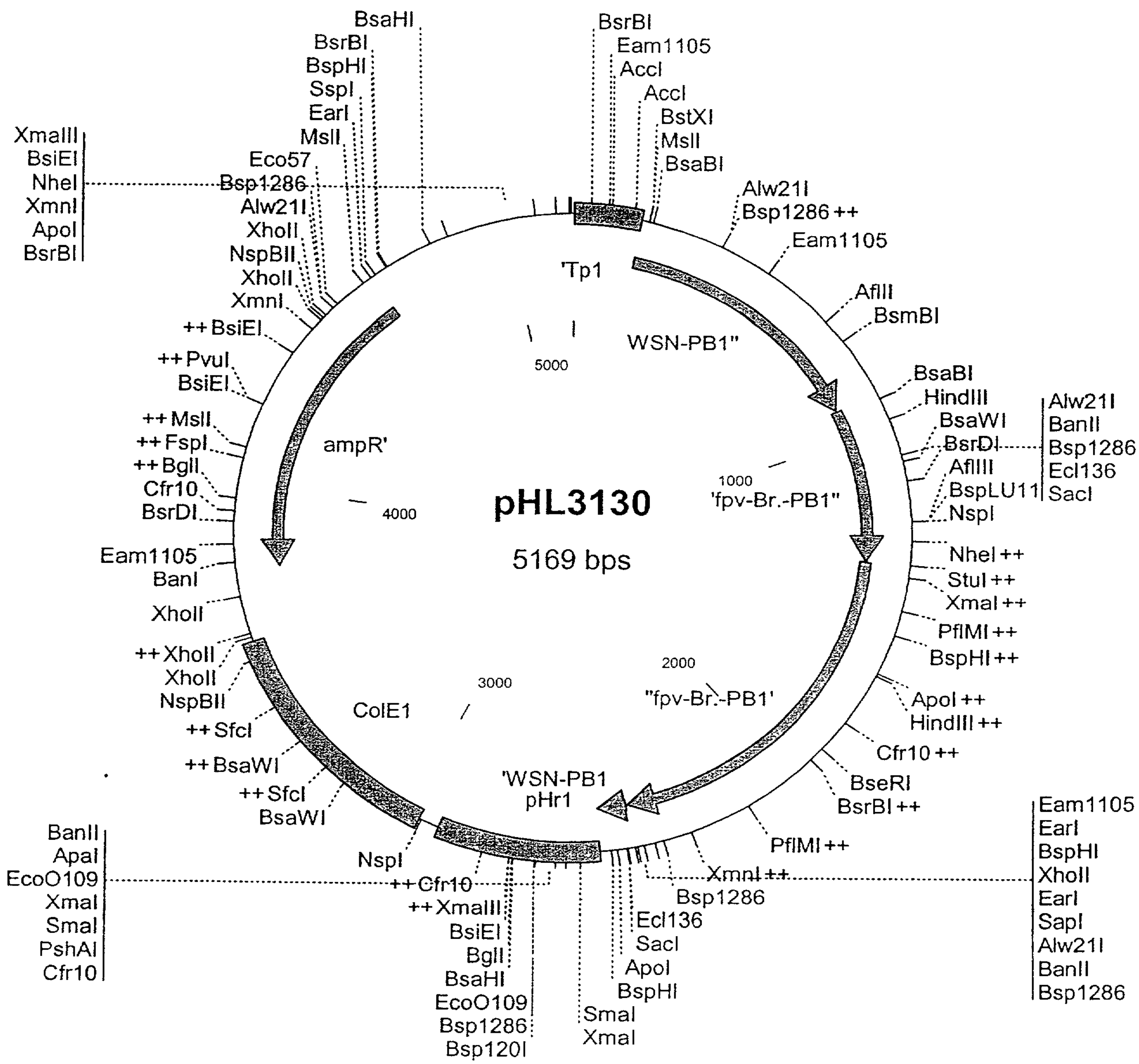
2000
3000
4000
BsiEI
EaeI
XmaIII
NheI
XmnI
ApoI
HaeII
BsaI
BsrBI
Eam1105
SalI
HincII
AccI
GsuI
ScaI++
XhoII
++Psp1406
++BsrBI
++MslI
++Alw21I
++XmnI
++BsiEI
++MslI
++PvuI
++MslI
++FspI
++BglI
GsuI
++BsrDI
Eam1105
BanI
DraI
++XhoII
++XhoII
XhoII
NspBII
++SfcI
++BsaWI
++SfcI
++BsaWI
DrdI
++AseI
EcoO109
Bsp120I
Bsp1286
BanII
EcoO109
AvaI
SmaI
XmaI
HaeII
PshAI
Cfr10
++BsiEI
++BsaHI
HaeII
HincII
ApaI
NgoMI
NaeI
SmaI
XmaI
AvaI
Bsp1286
Alw21I
ApoI
BspHI
Bsp1286++
ClaI++
HincII++
MslI
Eam1105++
AsuII
ApoI
HindIII
BsrBI
Eco57
PvuII
NspBII
AflIII
BsaAI
Cfr10
BsaWI
AgeI
BanI
BspHI++
PflMI++
XmaI++
StuI++
NheI++
AsuII++
AflIII
BsrDI++
BsaWI
HindIII
MunI++
BanII++
BstXI++
EarI
SfcI
XmnI++
Bsu36++
XhoII
NcoI
StyI
DsaI
NcoI
StyI
DsaI
TthI
HincII
SspI++
SacI
Bsp1286
Ecl136
BanII
Alw21I

Fig. 8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"fpv-Br.-PB1'
'WSN-PB1
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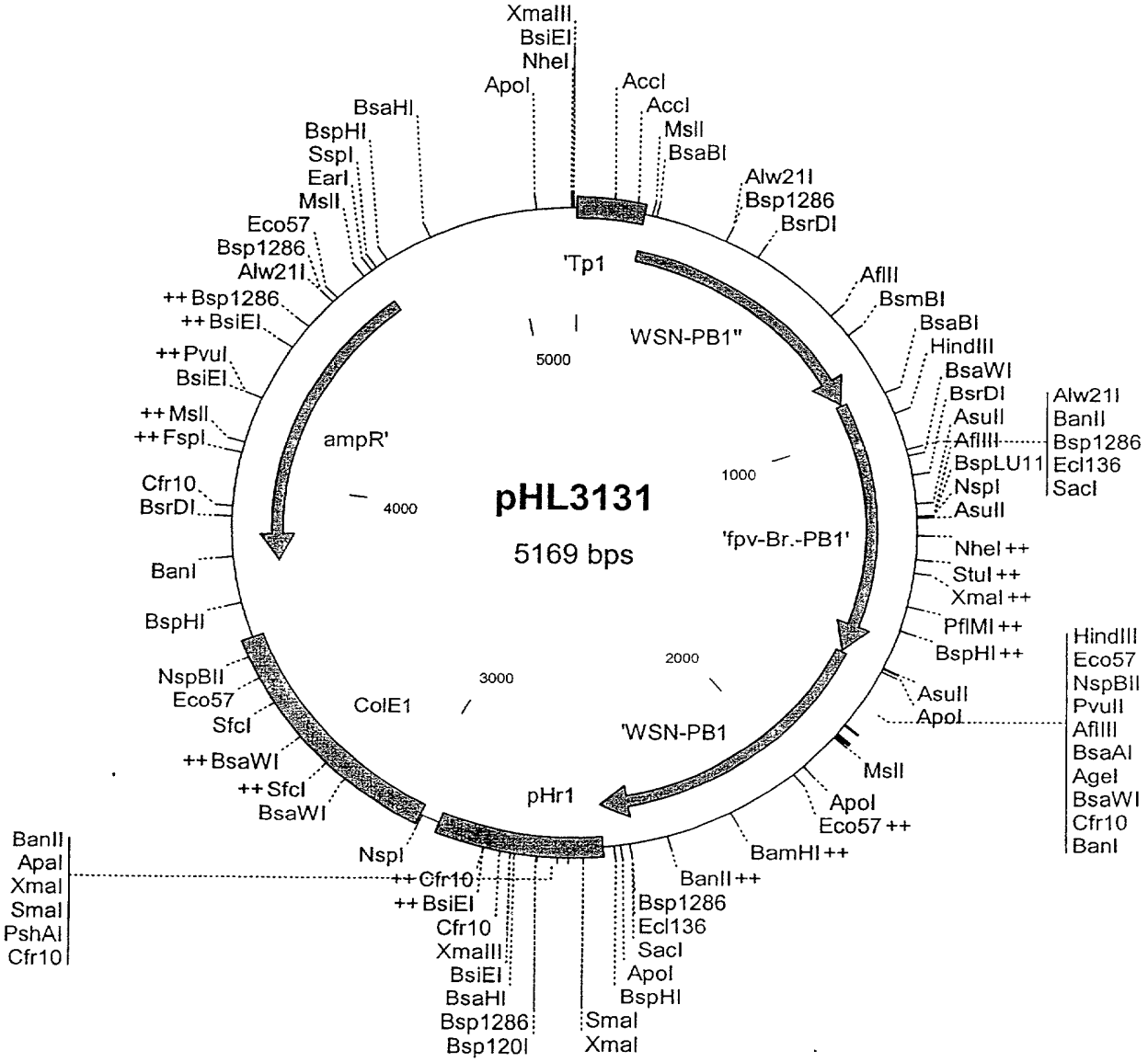
ColE1
ampR'
1000
2000
3000
4000
5000
BsrBI
Eam1105
AccI
AccI
BstXI
MslI
BsaBI
Alw21I
Bsp1286 ++
Eam1105
AflII
BsmBI
BsaBI
HindIII
BsaWI
BsrDI
AflIII
BspLU11
NspI
Alw21I
BanII
Bsp1286
Ecl136
SacI
NheI ++
StuI ++
XmaI ++
PflMI ++
BspHI ++
ApoI ++
HindIII ++
Cfr10 ++
BseRI
BsrBI ++
PflMI ++
XmnI ++
Bsp1286
Ecl136
SacI
ApoI
BspHI
SmaI
XmaI
Eam1105
EarI
BspHI
XhoII
EarI
SapI
Alw21I
BanII
Bsp1286
NspI
++Cfr10
++XmaIII
BsiEI
BglI
BsaHI
EcoO109
Bsp1286
Bsp120I
BanII
ApaI
EcoO109
XmaI
SmaI
PshAI
Cfr10
BsaWI
++SfcI
++BsaWI
++SfcI
NspBII
XhoII
++XhoII
XhoII
BanI
Eam1105
BsrDI
Cfr10
++BglI
++FspI
++MslI
BsiEI
++PvuI
++BsiEI
XmnI
XhoII
NspBII
XhoII
Alw21I
Bsp1286
Eco57
MslI
EarI
SspI
BspHI
BsrBI
BsaHI
XmaIII
BsiEI
NheI
XmnI
ApoI
BsrBI

10073417 " 020802

Fig. 9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'WSN-PB1
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ColE1
ampR'
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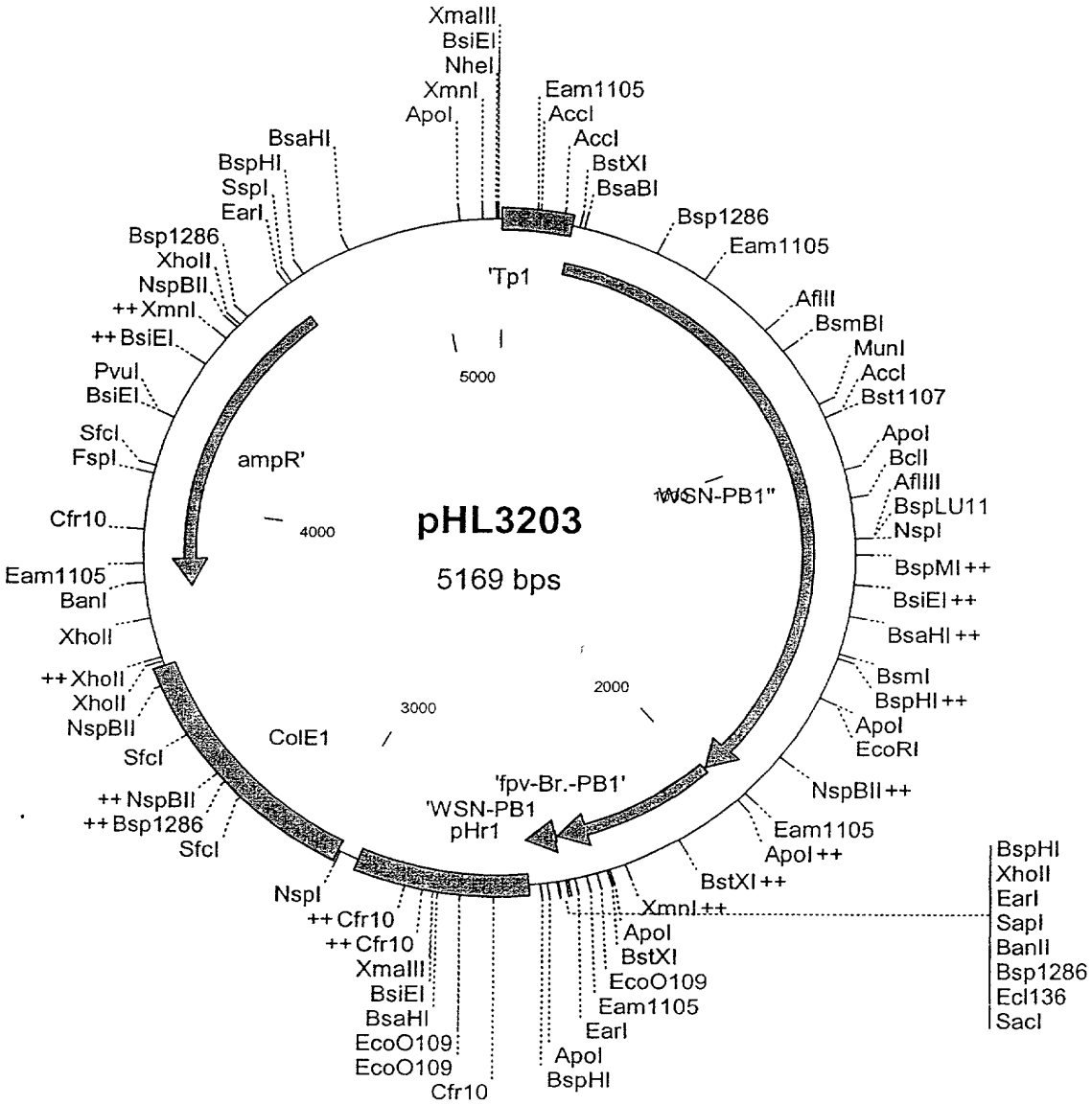
2000
3000
4000
5000
XmaIII
BsiEI
NheI
ApoI
AccI
AccI
MslI
BsaBI
Alw21I
Bsp1286
BsrDI
AflII
BsmBI
BsaBI
HindIII
BsaWI
BsrDI
AsuII
AflIII
BspLU11
NspI
AsuII
Alw21I
BanII
Bsp1286
Ecl136
SacI
NheI ++
StuI ++
XmaI ++
PflMI ++
BspHI ++
AsuII
ApoI
HindIII
Eco57
NspBII
PvuII
AflIII
BsaAI
AgeI
BsaWI
Cfr10
BanI
MslI
ApoI
Eco57 ++
BamHI ++
BanII ++
Bsp1286
Ecl136
SacI
ApoI
BspHI
SmaI
XmaI
Bsp120I
Bsp1286
BsaHI
BsiEI
XmaIII
Cfr10
++BsiEI
++Cfr10
NspI
BanII
ApaI
XmaI
SmaI
PshAI
Cfr10
++BsaWI
++SfcI
BsaWI
NspBII
Eco57
SfcI
BspHI
BanI
Cfr10
BsrDI
++MslI
++FspI
++PvuI
BsiEI
++Bsp1286
++BsiEI
Eco57
Bsp1286
Alw21I
MslI
EarI
SspI
BspHI
BsaHI

Fig. 10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'WSN-PB1
pHr1
ampR'
ColE1
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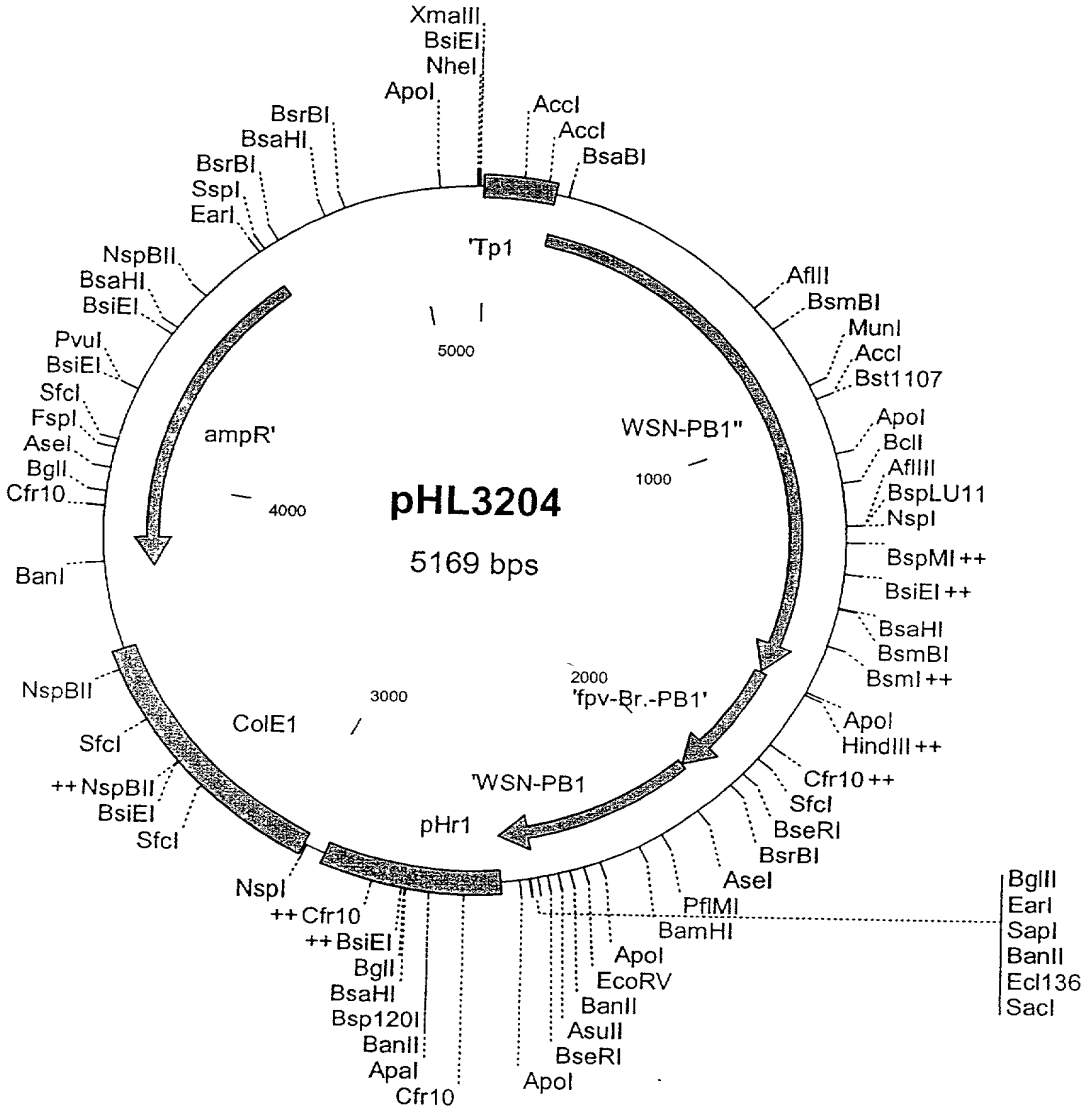
4000
3000
2000
XmaIII
BsiEI
NheI
XmnI
ApoI
Eam1105
AccI
AccI
BstXI
BsaBI
Bsp1286
Eam1105
AflII
BsmBI
MunI
AccI
Bst1107
ApoI
BclI
AflIII
BspLU11
NspI
BspMI++
BsiEI++
BsaHI++
BsmI
BspHI++
ApoI
EcoRI
NspBII++
Eam1105
ApoI++
BstXI++
XmnI++
ApoI
BstXI
EcoO109
Eam1105
EarI
ApoI
BspHI
NspI
++Cfr10
++Cfr10
XmaIII
BsiEI
BsaHI
EcoO109
EcoO109
Cfr10
++NspBII
++Bsp1286
SfcI
++XhoII
XhoII
NspBII
SfcI
XhoII
EamI105
BanI
Cfr10
SfcI
FspI
PvuI
BsiEI
++BsiEI
++XmnI
NspBII
XhoII
Bsp1286
BspHI
SspI
EarI
BsaHI
BspHI
XhoII
EarI
SapI
BanII
Bsp1286
Ecl136
SacI

Fig. 11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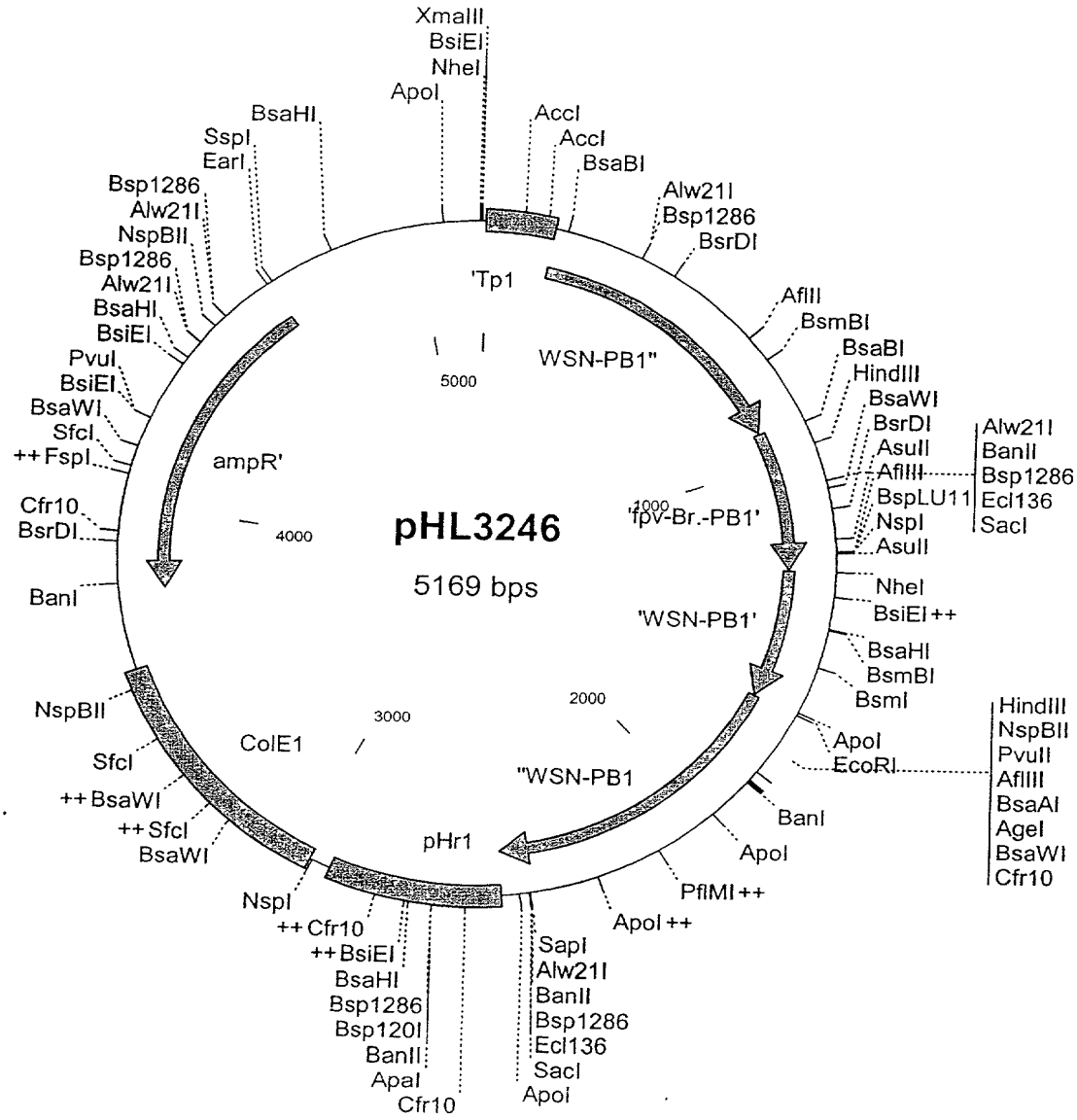
ColE1
4000
ampR'
XmaIII
BsiEI
NheI
ApoI
AccI
AccI
BsaBI
AflII
BsmBI
MunI
AccI
Bst1107
ApoI
BclI
AflIII
BspLU11
NspI
BspMI++
BsiEI++
BsaHI
BsmBI
BsmI++
ApoI
HindIII++
Cfr10++
SfcI
BseRI
BsrBI
AseI
PflMI
BamHI
ApoI
EcoRV
BanII
AsuII
BseRI
ApoI
BglII
EarI
SapI
BanII
Ecl136
SacI
Cfr10
ApaI
BanII
Bsp120I
BsaHI
BglI
++BsiEI
++Cfr10
NspI
SfcI
BsiEI
++NspBII
SfcI
NspBII
BanI
Cfr10
BglI
AseI
FspI
SfcI
BsiEI
PvuI
BsiEI
NspBII
BsaHI
BsiEI
BsrBI
SspI
EarI
BsrBI
BsaHI

Fig. 12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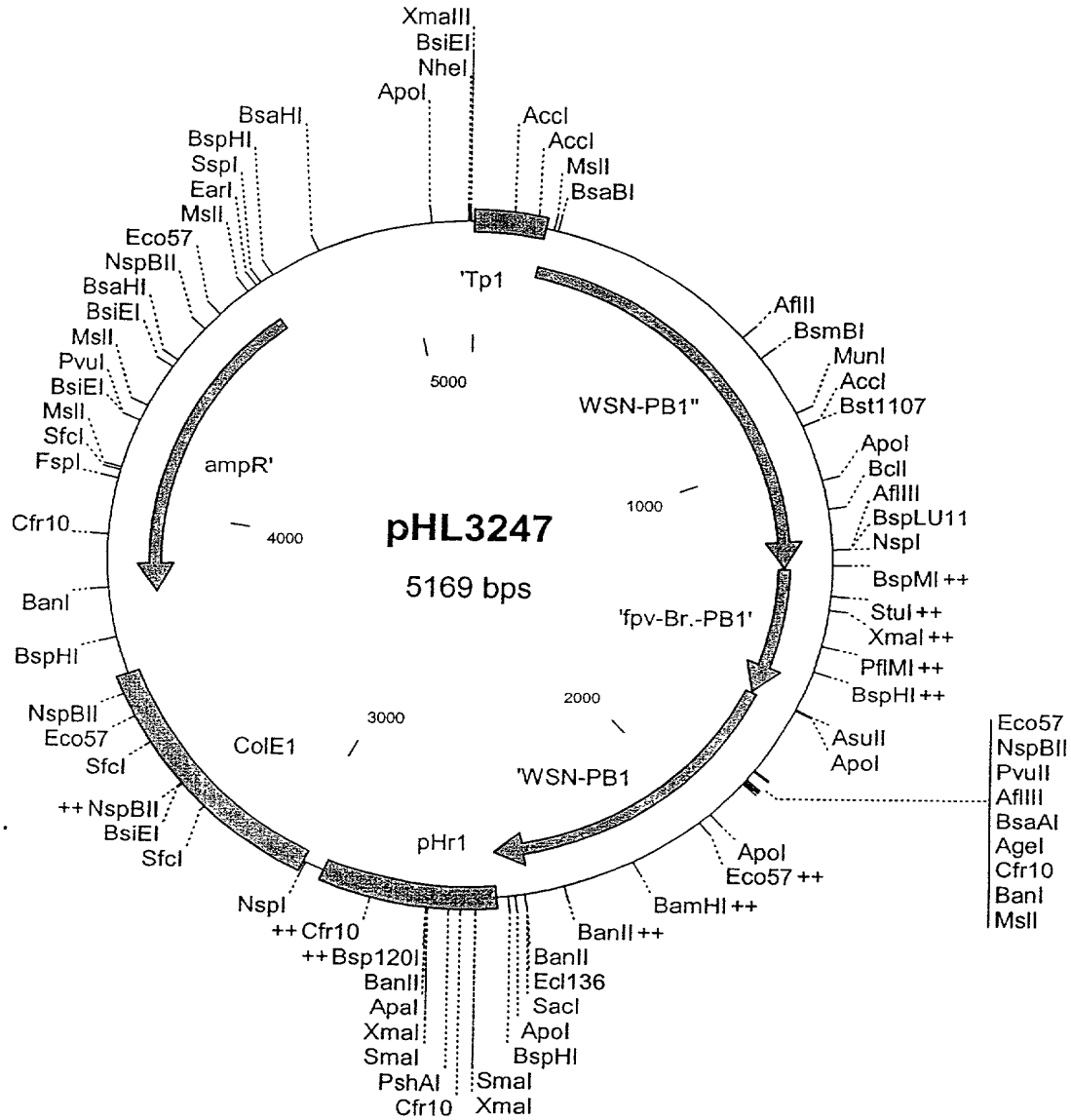
'fpv-Br.-PB1'
'WSN-PB1'
"WSN-PB1
pHr1
ColE1
ampR'
5000
1000
2000
3000
4000
XmaIII
BsiEI
NheI
ApoI
AccI
AccI
BsaBI
Alw21I
Bsp1286
BsrDI
AflII
BsmBI
BsaBI
HindIII
BsaWI
BsrDI
AsuII
AflIII
BspLU11
NspI
AsuII
Alw21I
BanII
Bsp1286
Ecl136
SacI
NheI
BsiEI++
BsaHI
BsmBI
BsmI
ApoI
EcoRI
HindIII
NspBII
PvuII
AflIII
BsaAI
AgeI
BsaWI
Cfr10
BanI
ApoI
PflMI++
ApoI++
SapI
Alw21I
BanII
Bsp1286
Ecl136
SacI
ApoI
NspI
++Cfr10
++BsiEI
BsaHI
Bsp1286
Bsp120I
BanII
ApaI
Cfr10
BsaWI
++SfcI
++BsaWI
SfcI
NspBII
BanI
Cfr10
BsrDI
++FspI
SfcI
BsaWI
BsiEI
PvuI
BsiEI
BsaHI
NspBII
Alw21I
Bsp1286
EarI
SspI
BsaHI

Fig. 13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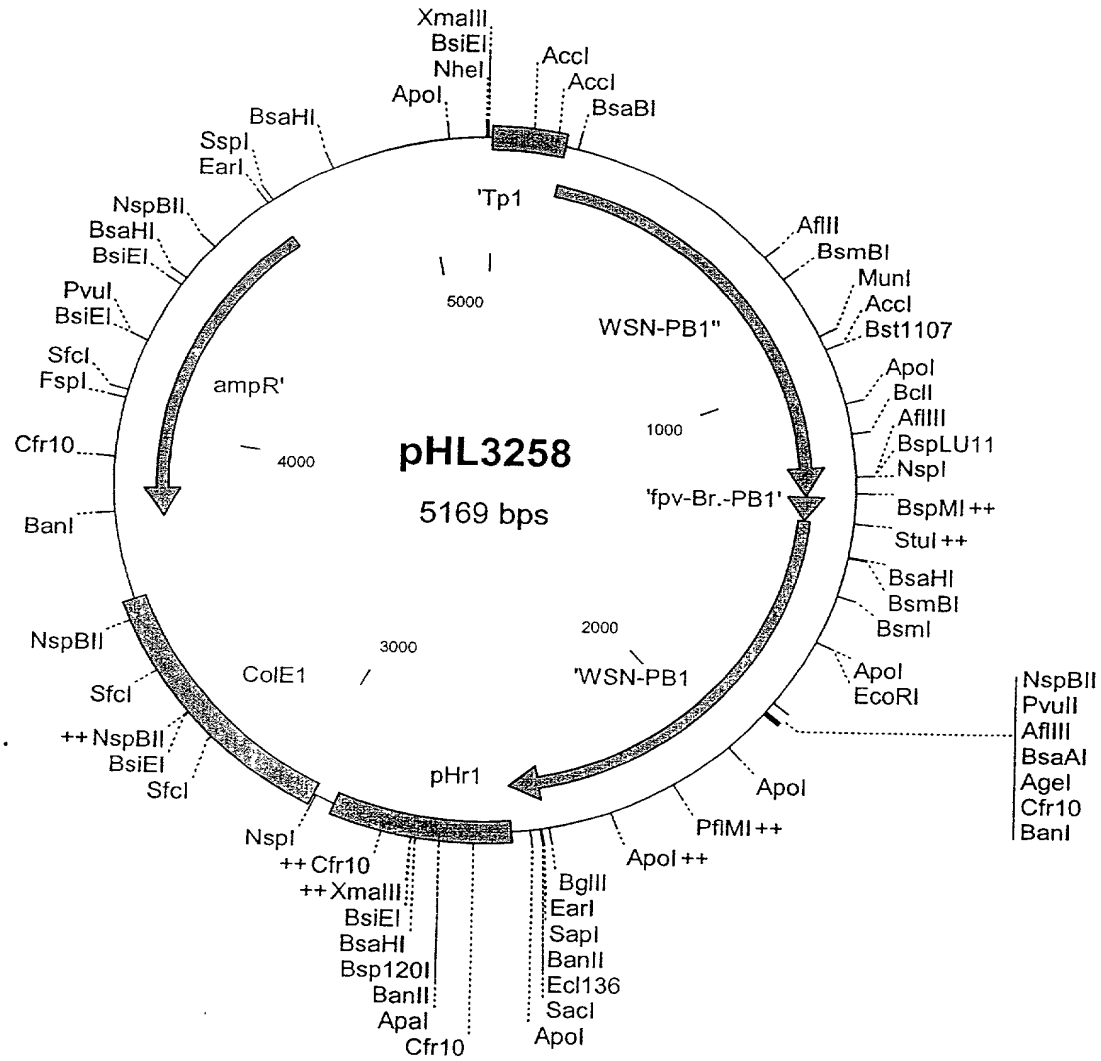
5169 bps
'Tp1
WSN-PB1"
'fpv-Br.-PB1'
'WSN-PB1
pHr1
ColE1
ampR'
5000
1000
2000
3000
4000
XmaIII
BsiEI
NheI
ApoI
AccI
AccI
MslI
BsaBI
AflII
BsmBI
MunI
AccI
Bst1107
ApoI
BclI
AflIII
BspLU11
NspI
BspMI ++
StuI ++
XmaI ++
PflMI ++
BspHI ++
AsuII
ApoI
Eco57
NspBII
PvuII
AflIII
BsaAI
AgeI
Cfr10
BanI
MslI
ApoI
Eco57 ++
BamHI ++
BanII ++
BanII
Ecl136
SacI
ApoI
BspHI
SmaI
XmaI
NspI
++ Cfr10
++ Bsp120I
BanII
ApaI
XmaI
SmaI
PshAI
Cfr10
NspBII
Eco57
SfcI
++ NspBII
BsiEI
SfcI
BanI
BspHI
Cfr10
FspI
SfcI
MslI
BsiEI
PvuI
MslI
BsiEI
BsaHI
NspBII
Eco57
MslI
EarI
SspI
BspHI
BsaHI

Fig. 14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5169 bps
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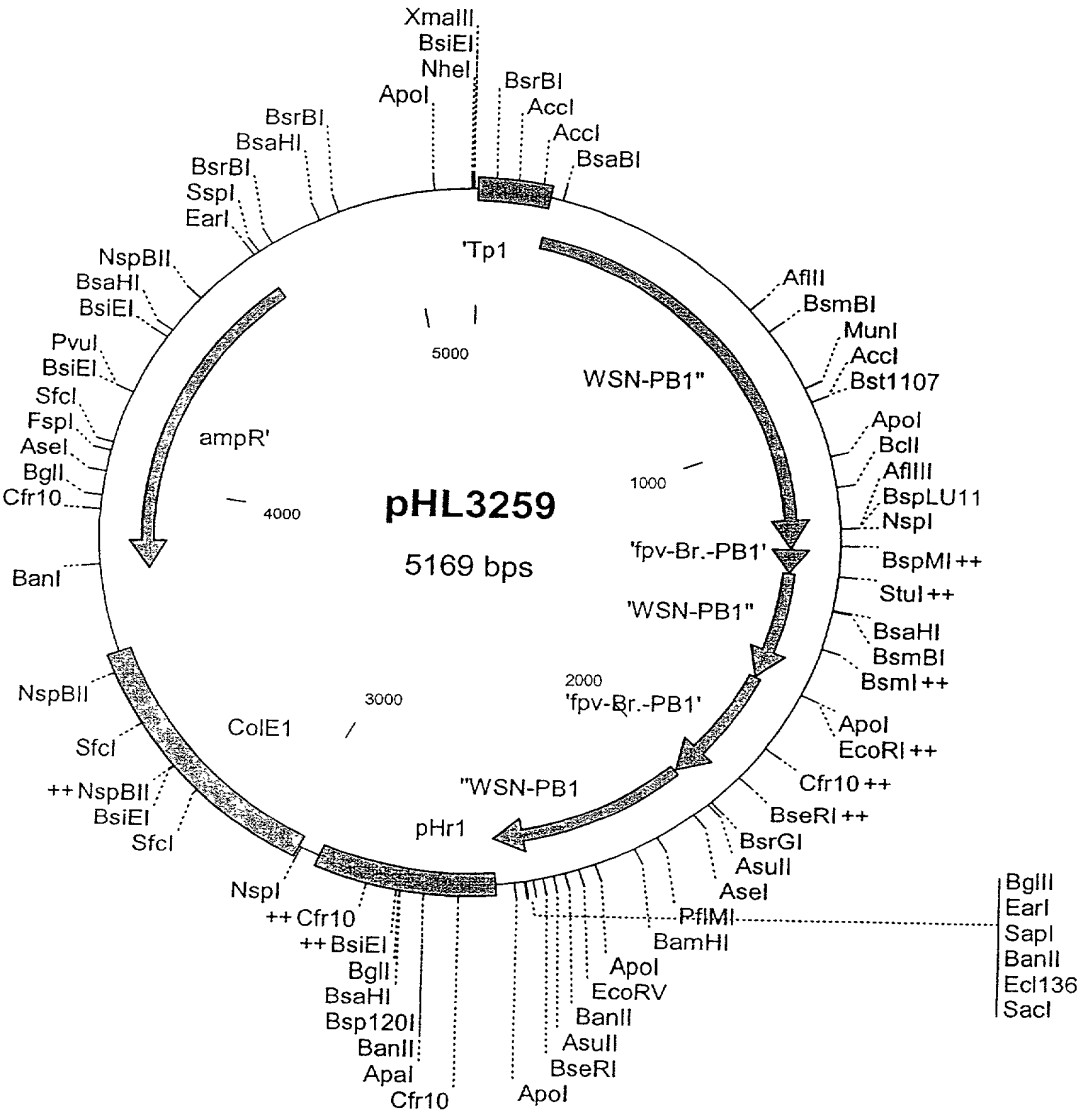
WSN-PB1"
'fpv-Br.-PB1'
'WSN-PB1
pHr1
ampR'
ColE1
1000
2000
3000
4000
5000
XmaIII
BsiEI
NheI
ApoI
AccI
AccI
BsaBI
AflII
BsmBI
MunI
AccI
Bst1107
ApoI
BclI
AflIII
BspLU11
NspI
BspMI++
StuI++
BsaHI
BsmBI
BsmI
ApoI
EcoRI
NspBII
PvuII
AflIII
BsaAI
AgeI
Cfr10
BanI
ApoI
PflMI++
ApoI++
BglII
EarI
SapI
BanII
Ecl136
SacI
ApoI
Cfr10
ApaI
BanII
Bsp120I
BsaHI
BsiEI
++XmaIII
++Cfr10
NspI
SfcI
BsiEI
++NspBII
SfcI
NspBII
BanI
Cfr10
FspI
SfcI
PvuI
BsiEI
NspBII
BsaHI
BsiEI
SspI
EarI
BsaHI

Fig. 15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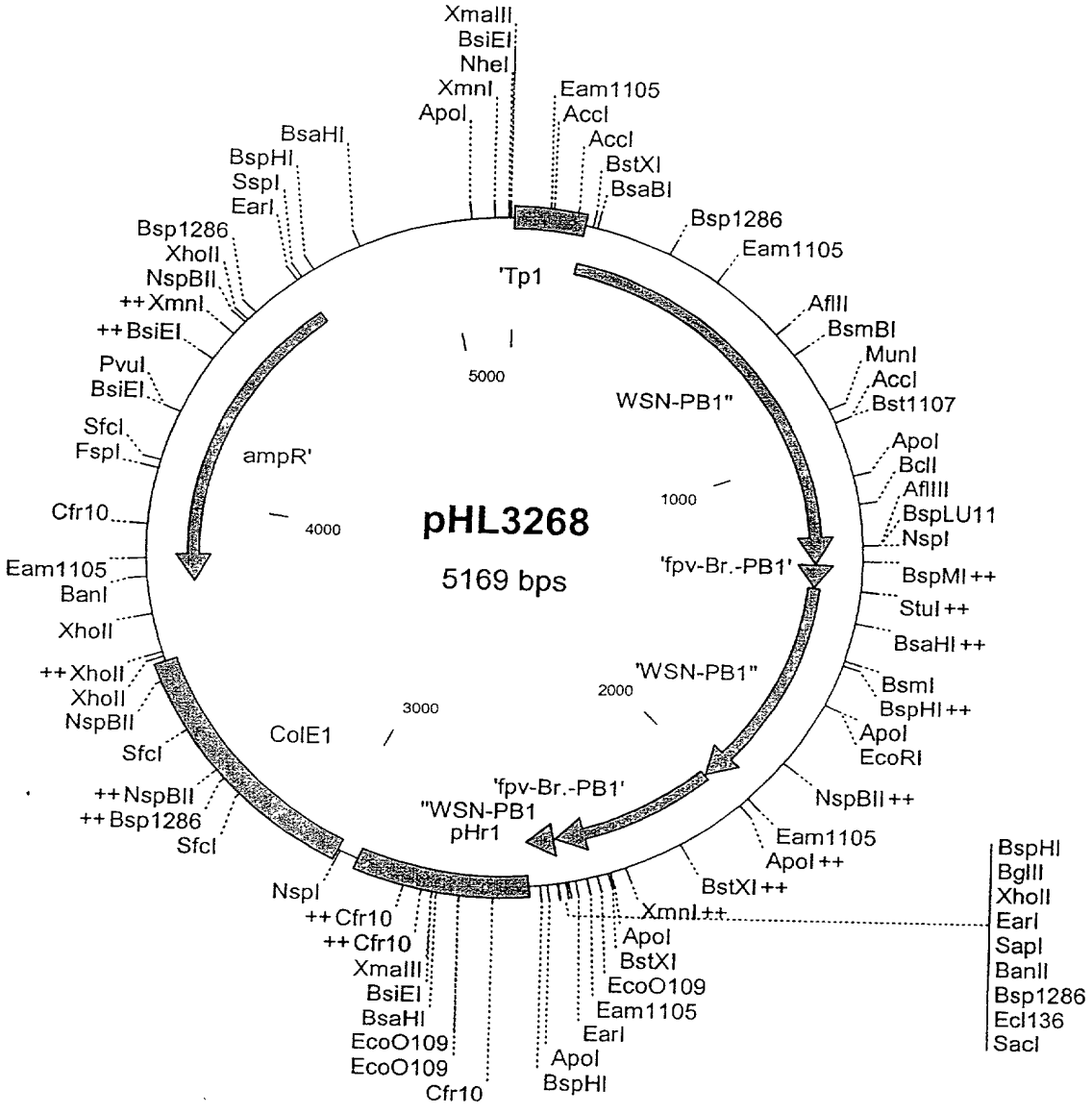
5169 bps
'Tp1
WSN-PB1"
'fpv-Br.-PB1'
'WSN-PB1"
'fpv-Br.-PB1'
"WSN-PB1
pHr1
ColE1
ampR'
5000
1000
2000
3000
4000
XmaIII
BsiEI
NheI
ApoI
BsrBI
AccI
AccI
BsaBI
AflII
BsmBI
MunI
AccI
Bst1107
ApoI
BclI
AflIII
BspLU11
NspI
BspMI++
StuI++
BsaHI
BsmBI
BsmI++
ApoI
EcoRI++
Cfr10++
BseRI++
BsrGI
AsuII
AseI
PflMI
BamHI
ApoI
EcoRV
BanII
AsuII
BseRI
ApoI
BglII
EarI
SapI
BanII
Ecl136
SacI
Cfr10
ApaI
BanII
Bsp120I
BsaHI
BglI
++BsiEI
++Cfr10
NspI
SfcI
BsiEI
++NspBII
SfcI
NspBII
BanI
Cfr10
BglI
AseI
FspI
SfcI
BsiEI
PvuI
BsiEI
NspBII
BsaHI
BsiEI
BsrBI
SspI
EarI
BsrBI
BsaHI
BsrBI

Fig. 16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5169 bps
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WSN-PB1"
'fpv-Br.-PB1'
'WSN-PB1"
'fpv-Br.-PB1'
"WSN-PB1
pHr1
ColE1
ampR'
1000
2000
3000
4000
5000
XmaIII
BsiEI
NheI
XmnI
ApoI
Eam1105
AccI
AccI
BstXI
BsaBI
Bsp1286
Eam1105
AflII
BsmBI
MunI
AccI
Bst1107
ApoI
BclI
AflIII
BspLU11
NspI
BspMI++
StuI++
BsaHI++
BsmI
BspHI++
ApoI
EcoRI
NspBII++
Eam1105
ApoI++
BstXI++
XmnI++
ApoI
BstXI
EcoO109
Eam1105
EarI
ApoI
BspHI
Cfr10
EcoO109
EcoO109
BsaHI
BsiEI
XmaIII
++Cfr10
++Cfr10
NspI
SfcI
++Bsp1286
++NspBII
SfcI
NspBII
XhoII
++XhoII
XhoII
Cfr10
SfcI
FspI
BsiEI
PvuI
++BsiEI
++XmnI
NspBII
XhoII
Bsp1286
EarI
SspI
BspHI
BsaHI
BspHI
BglII
XhoII
EarI
SapI
BanII
Bsp1286
Ecl136
SacI
Eam1105
BanI